Citation:

Locher JL, Roth DL, Ritchie CS, Cox K, Sawyer P, Bodner EV, Allman RM. Body mass index, weight loss, and mortality in community-dwelling older adults. *J Gerontol A Biol Sci Med Sci.* 2007; 62(12):1389-1392.

PubMed ID: 18166690

Study Design:

Longitudinal Observational Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

This study evaluates the association between body mass index (BMI), recent intentional or unintentional weight loss, and mortality in older adults.

Inclusion Criteria:

- Enrollment in the University of Alabama at Birmingham (UAB) Study of Aging
- African American or white adults

Exclusion Criteria:

- None noted

Description of Study Protocol:

Recruitment

Recruitment for the UAB Study of Aging was a random sample of Medicare beneficiaries between December 1999 and February 2001 from five Alabama counties.

Design: Longitudinal observational study

Initially participants were given a baseline questionnaire regarding mobility and overall health status; height and weight measurements were taken. Telephone interviews were conducted every six months for three years.

Blinding used (if applicable): none.

Intervention (if applicable): none.

Statistical Analysis

- Descriptive statistics
- Chi-square or one way analysis of variance (ANOVA) to measure differences between BMI groups and baseline characteristics
- Cox proportional hazards model for univariate and multivariate effects of BMI, weight loss and control variables on time of death over the three year period.

Data Collection Summary:

Timing of Measurements

Survey was administered and height and weight were taken at baseline. Telephone interviews took place every six months for three years.

Dependent Variables

- Mortality: Mortality was measured over a three-year period and validated through the Social Security Death Index.

Independent Variables

- Body mass index: BMI was calculated from measured height and weight using standing measurements, knee-height and arm circumference, or self-reported height and weight. BMI was put into classification categories according to the National Heart, Lung, and Blood Institute:
  - Underweight: BMI<18.5
  - Normal weight: BMI 18.5-24.9
  - Overweight: BMI 25.0-29.9
  - Class I obesity: BMI 30.0-34.9
  - Class II obesity: BMI 35.0-39.9
  - Extreme/Class III obesity: BMI≥40
- Weight loss: Participants were asked if they have lost weight (>10 pounds) in the past year, and if weight loss was intentional.

Control Variables

- Age
- Gender
- Ethnicity
- Smoking (within the last year)
- Presence of comorbidities

Description of Actual Data Sample:

Initial N: 1000 participants recruited for UAB Study of Aging

Attrition (final N): Final N = 983 (496 male, 487 female)

Age: Mean age = 75.30

Ethnicity: African American = 487 (49.54%); White = 496 (50.46%)

Other relevant demographics: Smoker (smoking in the past year) = 13.2%; Comorbidity mean count = 2.48

Anthropometrics

Location: Rural/suburban residents of five central Alabama counties

Summary of Results:

Key Findings

- In the adjusted model, underweight participants were more than 2 times more likely to experience mortality within three years over normal weight participants.
- Those participants reporting unintentional weight loss were 1.67 times more likely to experience mortality within three years than those that reported no weight loss.

Predictor	Multivariate Models *P*	Multivariate Model *P*
Weight Loss: Unintentional vs. none	.0009	.0080
BMI category: BMI <18.5 vs. 18.5-25	.0084	.0451

Other Findings

- In both raw and adjusted Cox proportional hazards models, older age, male gender, recent smokers, greater comorbidities, intentional weight loss and underweight BMI category significantly predicted mortality.
- There was no association in mortality with other BMI groups (overweight, obese, morbidly obese)
- There was no difference in mortality with those reporting intentional weight loss and no weight loss.
- An additional proportional hazards model including a BMI group x weight loss group interaction effect. Both were independent of each other, demonstrating that the effect of unintentional weight loss on mortality did not differ as a function of BMI group.

Author Conclusion:

Older adults who were undernourished as evidenced by being underweight or having unintentional weight loss had higher risk of mortality compared to those who were overweight/obese or experienced intentional weight loss.

Reviewer Comments:

- *Weight loss is self reported which may affect accuracy of reported losses.*
- *Participants questioned only about prior year weight loss so researchers are limited in knowledge about participants weight history overall.*
- *The study was limited in duration (three years.)*
- *Participant sample designed to have a 50% split male/female and 50% split African American/white, which limits applicability to the population.*
- *Participant withdrawals, outside of participant death, were not noted or described.*
- *The study did account for confounding factors.*
- *The study did use generally accepted classifications for BMI and weight loss.*
- *Blinding not applicable since study is observational and mortality is the outcome measured.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes
2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes

2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	No
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	Yes
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	Yes
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	Yes
5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	Yes

5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	Yes
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	Yes
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes
7.7.	Were the measurements conducted consistently across groups?	Yes
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**	Yes

8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes